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INTERPROFESSIONAL COLLABORATION IN THE ICU - FACILITATING PROGRESS IN TEAMS OF LEARNERS

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Interprofessional collaboration in the ICU - Facilitating progress in teams of learners THESIS FOR DOCTORAL DEGREE (Ph.D.)

By

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To the lights of my life: Bill, Ara and Loki.
You always guide me back to what's important in this world!

ABSTRACT

Background: Looking across research on health care education, few studies have explored processes of collaboration in interprofessional teams of participants at an interprofessional training unit (ITU) in intensive care. In particular, little is known about the active and evolving interplay between supervisors guiding groups and the learners' progress in becoming a team in their collaborative work in patient care. **The aim:** Is to contribute to the understanding of the collaborative interplay in teams of learners and facilitative actions of supervisors in interprofessional activities at an ITU in intensive care. The inquiry targets the progress of residents and specialist nursing students' participation in their collaborative interplay and the supervisors' strategies to facilitate the team of learners to gain control in their interplay. **Methods:** The thesis draws on qualitative data. Study I: Was a focused ethnographic study which aimed at exploring the collaboration in teams of learners during a rotation in an interprofessional education unit in intensive care from a sociocultural learning perspective. The interplay of eight teams of learners and supervisors (n=28) was explored and 100 hours of ethnographic observations, informal interviews, reflective sessions were analyzed through a constant comparative approach. Study II: A semi-structured interview study which described issues that facilitate collaboration in teams of learners at the same IPE unit. 19 participants were interviewed and the interview transcripts were subjected to a qualitative content analysis. Study III: Investigated support-seeking interplay in teams of learners during rounds. Observations, informal and semi-structured interviews, sound recordings of reflective sessions were reanalyzed and unused sound recordings of rounds were added. A framework approach was used to analyze material capturing the interplay among 46 participants. Study IV: Used the same material and method of analysis as study III to describe supervisors' strategies for facilitating learners' control in their collaborative interplay during interprofessional rounds at an ITU in intensive. **Results:** The results capture diverse aspects of the learners' collaborative interplay and the supervisors' facilitative actions. Study I: Suggests that the learners' collaboration progress in three main steps during the week. In particular, learners' progress from groups of individuals to becoming teams and the supervisors guide the work of these teams, gradually step back as the teams take control of the clinical work. Study II: The team of learners being in control is at the core and motivation, time, experiences and reflection are critical issues for facilitating collaboration. Study III: Revealed important variations in the learners' support seeking interplay during the round. In successful situations they explore, analyze, fill the interprofessional gaps by seeking confirmation, information and expertise and move on together as a team. Study IV: The supervisors' strategies develop from being present and gradually understanding the challenges that the learners face in their interplay. Losing control forms a natural part of the process of becoming a team and supervisors encourage, confirm and challenge the learners to regain interprofessional control and move on together. **Conclusions:** Learning and training how to collaborate successfully in intensive care involves a facilitated progress where more research is needed on suggested development and the long term benefits of training together in IPE settings.

LIST OF SCIENTIFIC PAPERS

- I. **Conte, H.** Scheja, M. Hjelmqvist, H. Jirwe, M. (2015). *Exploring teams of learners becoming "WE" in the Intensive Care Unit- a focused ethnographic study*. BMC Med Educ. Aug 16;15:131. Doi: 10.1186/s12909-015-0414-2.
- II. **Conte, H.** Jirwe, M. Scheja, M. Hjelmqvist, H. (2016). *Get it together: Issues that facilitate collaboration in teams of learners in intensive care*. Med Teach. 2016 May;38(5):491-7. Doi: 10.3109/0142159X.2015.1073237.
- III. **Conte, H.** Scheja, M. Jirwe, M. Hjelmqvist, H. *Filling the interprofessional gap. Analyzing the learners' support-seeking interplay during the rounds at an interprofessional training unit in intensive care*. Submitted.
- IV. **Conte, H.** Scheja, M. Hjelmqvist, H. Jirwe, M. *Stepping Back for the Team-Supervisor facilitating control in teams of learners during interprofessional rounds in intensive care*. Manuscript.

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1 BACKGROUND

1.1 INTERPROFESSIONAL COLLABORATION AND EDUCATION

After a worldwide review, the World Health Organization (WHO) now acknowledges that there is evidence that interprofessional education (IPE) can enable collaboratively ready practitioners in health care [1]. Despite this, systematic reviews have had problems establishing a link between the effect of IPE and improved patient care [2-4]. More recent studies question causal relationships, and look at learning and collaboration as mechanisms underpinning teamwork [5-6]. Individuals learn about the roles of their colleagues in health care by watching and asking questions, and the open climate is a contextual mechanism [6]. A formal setting and physical proximity are contexts that trigger collaboration among people on a team, and the pooling of their diverse professional knowledge [6]. Another systematic review [7] reinforces lack of knowledge and lack of experience in how to participate in interplay as factors that hinder new graduates from participating in interprofessional collaboration (IPC). The same study identifies lack of support from other team members as another crucial hindrance [7].

IPC is an active process whereby teams of professionals work together and contribute to their combined expertise in patient-centered care [8]. The participants negotiate their independent and interdependent goals in care and integrate, but still acknowledge, their different expertise while establishing and reaching common goals [9]. Changing levels of collaboration between intensive care professionals have been attributed to factors like education and knowledge [10], situational characteristics [11], and dimensions of authority and hierarchy in communication [10, 12-13].

The Centre for Advancement in Interprofessional Education (CAIPE) defines IPE as activities in which two or more professions learn together by working together to improve collaboration [14]. Learning together entails any activity in which teams learn from and with each other, either informally or formally. In Sweden, the Swedish Higher Education Ordinance acknowledges the importance of education focused on teamwork and collaboration. The skills and ability to collaborate are therefore stated as intended learning outcomes in the curriculum of university-based health care education in Sweden.

Sweden is viewed as a forerunner in IPE in the clinical setting, initially due to Linköping University and later Karolinska Institutet. Over the past 20 years, Interprofessional Training Wards (IPTWs) or Units (ITUs) have gradually been implemented in the hospital setting; initially IPTWs were set up for undergraduate students in orthopedic care, but later also in elderly and emergency care. More or less permanent options have also been set up for postgraduate learners in intensive care and in the operating room setting.

The concept of learning by working together suggests that learning is an experience-driven process for participants in real-life activities in health care, at both the undergraduate and postgraduate levels.

1.2 LEARNING THROUGH COLLABORATIVE ACTIVITIES AT AN ITU

Earlier research has suggested that there are variations in students' approaches to learning and the strategies they use in integrated situations at an IPTW [15]. In their activities, the students could be unaware of their learning and focusing on themselves. Their approaches could also involve learning as reflection, whereby the dialogue was holistic and complex. Through discussions with each other they made an inventory of their experiences and knowledge [15], sought support from each other, and met the positive challenges involved in taking care of patients [16]. Students from two or more professions undertake one- to three-week rotations at an ITU or IPTW in the clinical setting. They work in small groups in patient care with educational goals focused on collaboration and knowledge of their own and the other professionals' roles on the team [17-23]. Some students express joy in working on a team towards a common goal [16]. They express to different extents that the interprofessional training led to an increased knowledge of their professional roles and an understanding of the importance of teamwork [16, 19, 22-23]. Supervisors' permissive attitude enabled the students to learn together, take responsibility, act independently, and seek support from each other [16].

Students from different professions learn from and with each other in activities, e.g. during rounds, at team conferences, and in common procedures [17-23] and shift handovers [16]. The type of activities and how they are arranged can influence their learning and collaboration [18, 20]. Collaborative activities experienced by students as highly challenging, with learners having high levels of competence [20]. Some activities were viewed as expected professional responsibilities, for example rounds led by medical students or supervisors [18]. Other activities were powerful, while some were unexpected and clashed with the learners' general understanding of their professional responsibilities [18].

Rounds can be a favorable activity for students' learning and collaboration [16, 18, 24-25] due to their structure and amount of allotted time [16]. In one study, 100% of medical students regarded rounds as more or less valuable, and as a place where both learning and teaching took place [25]. Rounds can also be an activity in which the more experienced professionals uphold the status quo and dominate a group's participation [26].

1.3 SUPERVISING TEAMS IN COLLABORATIVE ACTIVITIES AT AN ITU

Research has shown that how supervisors support the team in their collaborative interplay is crucial, since the learners have different expectations regarding the supervisors' level of engagement in the activities at the ITU [25].

The degree to which the different supervisors are present at the ITU seems to depend on organizational factors, like the ward structure and other parallel obligations, whereby supervising nurses seem to be present to a higher degree than, e.g., physicians and physiotherapists. The supervisors at an ITU balance facilitative actions that are both profession- and team-specific. Giving the team time, having patience, offering encouragement, and giving feedback in and on action were important for the team to develop

their skills, seek knowledge, and interact with each other and patients [16]. Research also points out that both how supervisors facilitate learners' collaborative interplay and rounds are vital [15, 18, 25-28]. Rounds can be used as a learning activity [29] in which there are different expectations regarding the supervisors' support [25, 28, 30-31]. Knowing how much, and when, to intervene in a team's interplay is a challenge [28]. The supervisors' strategies are flexible, and depend on the situation [32]. Their strategies focus on building a team, whereby the main responsibility is creating opportunities for independent work, facilitating professional understanding, and breaking down barriers [27].

As facilitating learning from and with each other is at the core of IPE, supervisors must optimize the exchange between professionals and maintain their diversity in the process [14].

1.4 THEORETICAL FRAMEWORK AND RATIONALE FOR RESEARCH

Learning can be understood as a process through which a person becomes part of – and acts on the presumption of being part of – a particular group [33]. It is an active process whereby the heterogeneity of the group and the shared activities facilitate a deeper understanding through collaborative analysis and critical reflection [34].

Learning in interprofessional education has a specific purpose and can be achieved through the learners' participation in, and the supervisors' facilitation of, the group's activities. Research has indicated that the ICU team is a fluid entity, a group of individuals with diverse professional identities [35]. The core team consists of two to three people caring for the patient at the bedside, and expands to an extended team e.g. during round [10]. The expanding and contracting nature of the ICU teams depends on the demands of the situation, and ownership is a central concept in the interplay [10, 35]. Collaboration in the ICU entails ownership in common work, whereby participants due to their expertise belong to a group and have the right to participate, negotiate and decide [35]. Collective ownership is at the core of the group's identity, and the individual ownership of each participant can be recognized by others in the group [10]. The perception of individual and group ownership, for example due to skills or knowledge, forms the basis of negotiation in the interaction. The negotiation within and outside the group is a constant social game, and is at times difficult [10].

The learners' interplay in activities at an ITU can progress through how they talk and act when the teams at the ITU begin to gain ownership and gradually move from a more peripheral to a more central membership within a specific socio-cultural group [36]. The learners' interplay with each other can progress, as can the actions of the supervisors guiding the IPE teams. The movement can be understood through guided participation and participatory appropriation. Guided participation focuses on interpersonal processes in managing one's own roles in relation to those of others, through communication and cooperation within the group [37]. Participatory appropriation underscores that understanding is not a stored possession of the individual but rather a dynamic event in which meaning is created through interaction with others [37].

When I started this project, as well as when I looked over the research on health care education, I noted that few studies have explored processes of either collaboration or learning in interprofessional teams of participants at an ITU on the postgraduate level in the ICU. There is thus a need for scientific knowledge about the active and evolving interplay between supervisors guiding groups and the learners' progress in becoming a team in their collaborative work in patient care.

2 AIM OF THE THESIS

The overall aim of this thesis is to contribute to the understanding of the collaborative interplay in teams of learners as well as the facilitative actions of supervisors in interprofessional activities at an interprofessional training unit (ITU) in intensive care. The inquiry targets the progress of residents and specialist nursing students' participation in their collaborative interplay. It also targets supervisors' strategies for facilitating the team of learners to gain control in their interplay during round. More specifically, the thesis includes the following four aims:

- To explore the collaboration in teams of learners during a rotation in an interprofessional education (IPE) unit in intensive care from a sociocultural learning perspective (Study I)
- To describe issues that facilitate collaboration in teams of learners in an IPE unit at an ICU (Study II)
- To investigate the support-seeking interplay in teams of learners during rounds at an ITU in intensive care (Study III)
- To describe supervisors' strategies for facilitating learners' control in their collaborative interplay during interprofessional rounds at an ITU in intensive care (Study IV)

3 CONTEXT OF THE STUDIES

In Studies I and II the term *interprofessional education unit* is used in the articles, and in Studies III and IV *interprofessional training unit* is used in the manuscripts to describe the same educational option. The ITU (term used henceforth) is located at a 16-bed high-dependency ICU at a university hospital in Stockholm. There is a minimum one-to-one patient and care staff ratio at the ICU and the ITU. The medical and paramedical staff consists of specialists, residents, auxiliary nurses, specialist nurses, and physiotherapists.

The ITU is active during the morning shift for one to two groups of learners for 12 weeks a year. Each week the supervising team consists of one specialist nurse, one specialist physician, and one head supervisor. The teams of learners at the ITU consist of one specialist nurse student and one resident in their specialist training. Most commonly, the resident coordinates his or her work between two teams. The learners receive a two-hour theoretical introduction to the principles of interprofessional education, the educational goals for the four-day rotation at the ITU, the role of the supervisors, and principles of reflection in/on action.

Each team is responsible for planning, performing and coordinating the care of one adult patient with each other, the ICU staff, and other professionals from outside the ICU. The patients at the ITU commonly suffer from respiratory and circulatory failure, and have often been recently intubated or are in the weaning phase of their ventilation treatment. Like at the main ICU, routines for care, administration and computer support are in place to ensure continuity in the patient care. The ITU's physical location within the ICU varies from week to week, depending on assigned patients. The ITU is not separated by physical barriers from the rest of the ICU.

The specialist nurse students' work is mainly situated in close proximity to the patient, whereas the residents' work requires them to move around outside the ICU. The learners' collaborative work is situated in two main areas. The patient area consists of four- or single-bed rooms equipped for treating and monitoring patients, where the team does their assessments and procedures. Each bed has partitions for closing off the physical space around the patient. These were used consistently by all the learners to protect patients' integrity. The administrative area is used for the learners' daily hour-long rounds in the morning, and for 30-minute reflective sessions in the afternoon.

There was a daily 30-minute reflective session for the learners and supervisors together, and then a 30-minute reflective session for only the supervisors.

4 METHODOLOGY

Qualitative research focuses on describing and understanding an activity from the participants' experiences and actions [38-39]. The phenomenon of interest in the thesis is the collaboration in teams of learners and the facilitative actions of the supervisors at an ITU in the ICU. The underlying assumption in the thesis is that the actions of a group are meaningful and that their participation in collaborative activities is shaped by individual, educational, social, and cultural aspects [38, 40-41]. At the core in interprofessional education is that two or more professions learn how to collaborate from and with each other as well as others in a professional setting [14]. The learners' collaboration should be viewed in relation to their supervisors' facilitative actions. The explanations of the collaborative progress can be found in the interface between the actions of the group of learners and between the actions of the learners and supervisors.

In qualitative studies, the researcher views the participants as experts [38]. Exploring and describing a phenomenon entails learning from the participants' experiences, reflections and actions in their setting. Uncovering meaning suggests grounding the description in both empirical materials and theoretical explanations. Critical realism acknowledges that what is studied corresponds to both real-life processes and the researcher's constructed theoretical elements [42]. The creation of meaning is achieved by moving between the participants' experiences, reflections and actions to create descriptions and theoretical interpretations [42].

The overall approach in the thesis consists of qualitative descriptions that enable exploring, describing and interpreting different aspects of the learners' participation in the collaborative interplay and the supervisors' facilitative actions in their natural setting. The study uses different qualitative designs to explore and make inferences regarding the participants' actions.

4.1 PARTICIPANTS

The participants in Studies I-IV were purposefully sampled for a period of a year during 2009-2010. All the supervisors and learners scheduled to attend the ITU were invited to participate in the study. Oral and written information was provided at introduction meetings before the start of two semesters.

4.1.1 Study I

One specialist nursing student declined to take part in the study. Ultimately, the learners and supervisors from eight teams were included (a total of 28 participants).

Thirteen participants were learners, fourteen were supervisors, and one was a head supervisor. The learners consisted of eight specialist nurse students (two men and six women) and five residents (one woman and four men). The supervisors consisted of eight specialist nurses (all women) and six specialist physicians (three men and three women). The head

supervisor was a nurse (man). The observations and reflections of one medical supervisor were later removed from the materials.

4.1.2 Study II

All the supervisors and students were invited to participate in the study (n=36); 19 participants ultimately gave their consent and participated in the study.

Two head supervisors were included (specialist nurses), one man and one woman. Nine supervisors (three specialist physicians and six specialist nurses) were also included. All the supervising specialist nurses were women, and of the specialist physicians one was a man and two were women. Eight learners were included (three residents and five specialist nurse students). Of the residents two were men and one was a woman, and all the specialist nurse students were women. All participants were offered the possibility to read their own interview transcript, and eight chose to do so. None of them wished to retract their participation or to change or add to their interview.

4.1.3 Studies III and IV

The 46 participants from Studies I and II were included in Studies III and IV (See Table 1).

Table 1. Participants included in Studies III and IV

Participants	Women	Men	Total per group
Supervisor nurses	14	0	14
Supervisor physicians	5	3	8
Head supervisors	1	2	3
Specialist nursing students	11	2	13
Residents	2	6	8
Total	33	13	46

5 DESIGN

Studies I-IV (see Table 2) were designed to explore, describe and interpret diverse aspects of the collaborative interplay in teams of learners and the facilitative actions of supervisors in interprofessional activities at the ITU in the ICU.

Designing and then performing each study led to reflections on the strengths and limitations with of each design. These were taken into account in the development of the aim (the *what*) of each consecutive study; thus, this new aim was important for the overall thesis and how the next study would be designed.

Table 2. Overview of design, Studies I-IV

Study	Aim	Participants	Design	Material excluded
I	To explore the collaboration in teams of learners during a rotation in interprofessional education unit in intensive care from a sociocultural learning perspective	8 teams of learners and supervisors: <ul style="list-style-type: none"> • 28 participants • 13 learners • 14 supervisors • 1 head supervisor 	<ul style="list-style-type: none"> • Explorative approach • Focused ethnographic study • 100 hrs. of observations and informal interviews • Contextual descriptions • 4 hrs. sound recordings of reflective group sessions • Constant comparative analysis 	Observations and reflections of one supervisor
II	To describe issues that facilitate collaboration in teams of learners in an interprofessional education unit in intensive care	19 PARTICIPANTS: <ul style="list-style-type: none"> • 8 learners • 9 supervisors • 2 head supervisors 	<ul style="list-style-type: none"> • Descriptive approach • Qualitative interview study • Critical Incident Technique • Qualitative content analysis 	
III	To investigate the support-seeking interplay in teams of learners during rounds at an interprofessional training unit in intensive care	46 PARTICIPANTS <ul style="list-style-type: none"> • 21 learners • 22 supervisors • 3 head supervisors 	<ul style="list-style-type: none"> • Descriptive approach • Qualitative study • Observations of 25 rounds • Sound recording of 25 rounds • 25 group interviews • 6 individual interviews • Reflective sessions • 15 semi-structured interviews • Framework approach analysis 	Material from Studies I and II that did not focus on collaborative interplay during rounds. Sound recordings of poor quality
IV	To describe supervisors' strategies for facilitating learners' control in their collaborative interplay during interprofessional rounds at an interprofessional training unit in intensive care	46 PARTICIPANTS <ul style="list-style-type: none"> • 21 learners • 22 supervisors • 3 head supervisors 	<ul style="list-style-type: none"> • Descriptive approach • Qualitative study • Observations of 25 rounds • Sound recording of 25 rounds • 25 group interviews • 6 individual interviews • Reflective sessions • 15 semi-structured interviews • Framework approach analysis 	Material from Studies I and II that did not focus on collaborative interplay during rounds. Sound recordings of poor quality

5.1 DATA COLLECTION AND ANALYSIS

The data collection in the project (Studies I-IV) took place over a year with a varied intensity and focus. The main data collection for Study I took place in the fall/winter of 2009 and at the beginning of 2010. The planning, pilot-testing and data collection of Study II took place in the winter and spring of 2010 and had ended by the fall of 2010. The review and selection of the previously collected material to be included in Studies III and IV took place in the spring and fall of 2015 (see Table 2).

Analyzing qualitative materials can be time-consuming and challenging [43-45]. Managing the amount of material, making sense of the emerging patterns, and abstracting these patterns into analytic accounts requires work that was challenging in all four studies (I-IV). It required being structured, and grounding the accounts in descriptions to make them understandable. It also required abstracting explanations and meanings. Choosing and using each analysis method in the thesis was preceded by an extensive literature review, seeking expertise from within and outside the research group.

5.1.1 Study I

Study I was a focused ethnographic study with an exploratory aim. A focused ethnographic study applies ethnographic methods to a distinct issue in a smaller community [41, 46]. This is done in order to learn from people and understand their experiences of a distinct issue [40]. It differs from conventional ethnography in several crucial aspects: the field visits are shorter; the researchers usually have contextual knowledge; and the study is data-intensive and uses combinations of collection methods in order to understand a group's activity through observing, asking and reflecting [40].

I collected all the data while following the eight teams of learners and their supervisors throughout their collaborative activities during their rotations at the ITU in the ICU (see Table 2). The learners' participation in collaborative activities and their supervisors' support in activities (e.g. assessment and rounds) were explored through ethnographic observation. As suggested in the literature, I took a stance of a lower degree of participation [40]. I offered my reflections and support when this was requested by participants. I explored the participants' experiences and thoughts on their collaborative interplay through short informal group and individual interviews. I used pictograms to initially document the observations and interviews, and then transferred these to handwritten field notes on the same day. The supervisors' reflective sessions (both with and without the learners) were audio-recorded and then later transcribed verbatim to capture their reflection of the learners' participation and their own supportive actions. To further explain and frame the activities, contextual explanations surrounding each observed team were documented and merged inductively with the field notes. Personal and analytic memos were written at the end of each day, capturing my feelings and problems in process and emergent theoretical ideas. These tools were used to distinguish between description, meaning, and theoretical content in process, and were merged inductively with the field notes.

The material used in the analysis consisted of close to 100 hours of observations, which included the interviews as well as four hours of audio-recorded reflections, demographic data and analytic memos (see Table 2).

The analysis process was guided and inspired by the constant comparative approach [44], after both an ethno-semantic and a hermeneutic approach had been rejected. It offered a systematic but time-consuming way to code and recode the material, whereby the emergent patterns were compared in and between each group. The process was iterative, and initially

ran parallel to the data collection. The analysis progressed through three inductive steps (see Figure 1), and took the better part of a year and a half from when the analysis intensified at the beginning of 2011.

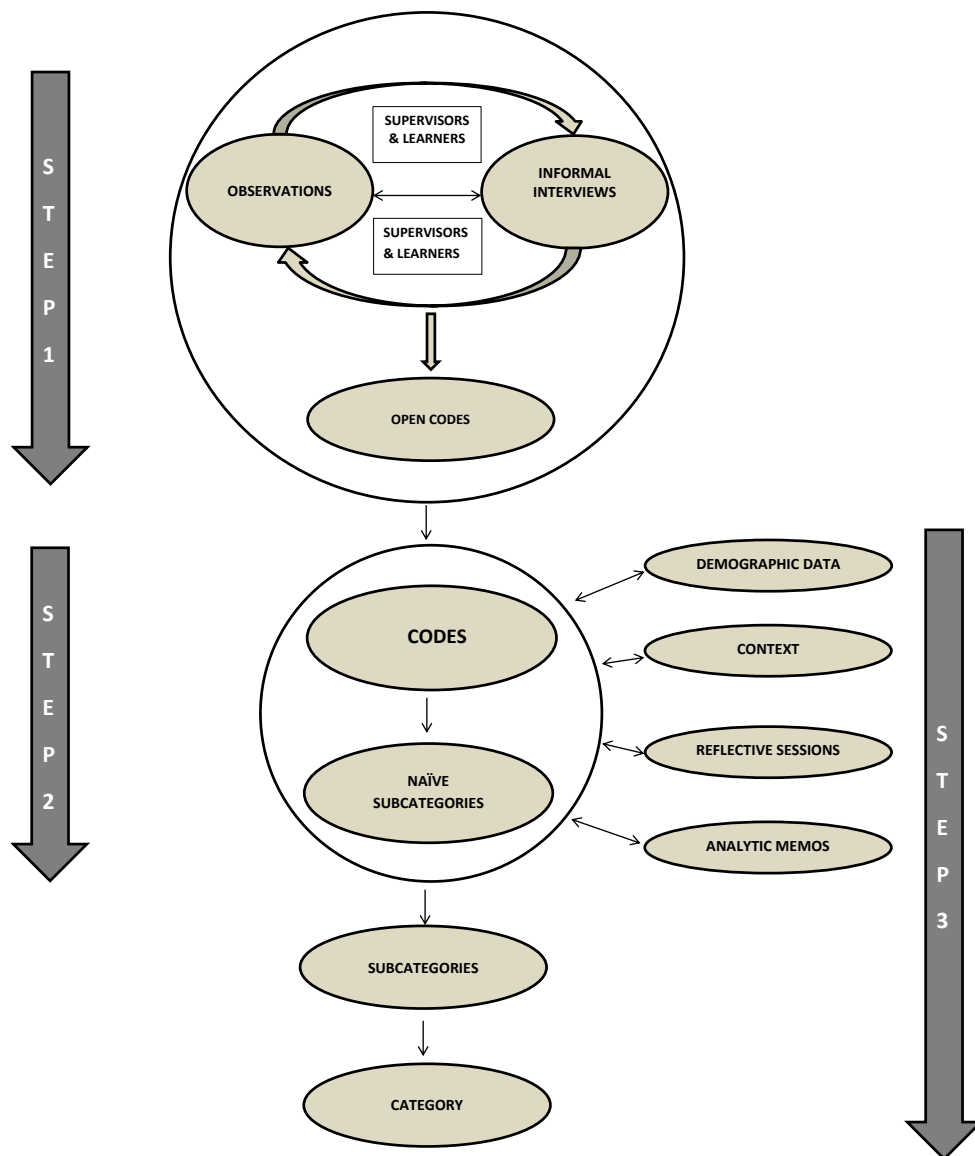


Figure 1. Analysis process of Study I

In the first step of the analysis, the observations and informal interviews documented in handwritten field notes were sorted chronologically, read through and transferred into electronic versions, which took approximately three months. Open codes were generated, freely representing descriptive content of the learners' and supervisors' participation in each group's chronological activities through the week, which took another two months.

In the second step, the material was continually coded to identify common patterns of the progress in and between each group, initially chronologically (see Figure 1). Codes beginning to explain the meaning of changing participation were generated. Recurrent patterns of the learners' participation in the collaborative interplay and the supervisors' guidance of their progress were identified. The codes were sorted into eight categories with descriptive headings, which took another six months. The third step, which took another eight months, entailed selectively coding material on the meaning of the changing participation in and between the teams, reviewing the consistency and variations against demographic data on the teams, contextual factors, sound recordings and analytic memos. Eight categories were collapsed into one category representing the overall progress in all the teams and three subcategories representing three distinct steps in the progress (see Figure 1). Excerpts were used to ground the core of progression from the different materials.

Study I was designed to explore and understand the collaborative interplay. During the process it became evident that it was hard to capture each individual's reflections on collaboration in a structured fashion. The design was pilot-tested, and it was noted that the collected materials were rich and that the strength of the study design was that the observations, informal interviews, group reflections and descriptions of the environment captured varied explanations of the aims. The need for further individual reflections on collaboration at the end of their rotation was identified.

5.1.2 Study II

In Study II, semi-structured interviews based on the Critical Incident Technique (CIT) were used [47]. The CIT focuses on capturing current and clear descriptions of incidents the participants have experienced. The goal is to describe and make inferences as to critical issues [48]. The 19 participants were asked to describe two incidents, one a well-functioning incident of interprofessional collaboration and one the opposite; follow-up questions were then asked. The 19 interviews lasted 13-47 minutes (mean 25 min), and I performed them as soon after the rotation as possible (ranging from the last day to a month after). The participants chose the location for the interviews; three were conducted over the telephone and the rest were face-to-face.

The interviews were transcribed verbatim, and the participants were offered the chance to review the transcript. None of the participants withdrew, changed or added anything to transcripts.

The analysis process was an inductive qualitative content analysis [43], and took the better part of ten months. I reviewed different methods and traditions of qualitative content analysis, and ultimately settled on the process by Elo & Kyngas since it offers a comprehensible analytic approach to generate broad, content-focused categories through description, explanation and abstraction (see Figure 2). The analysis consists of preparation, organization and reporting.

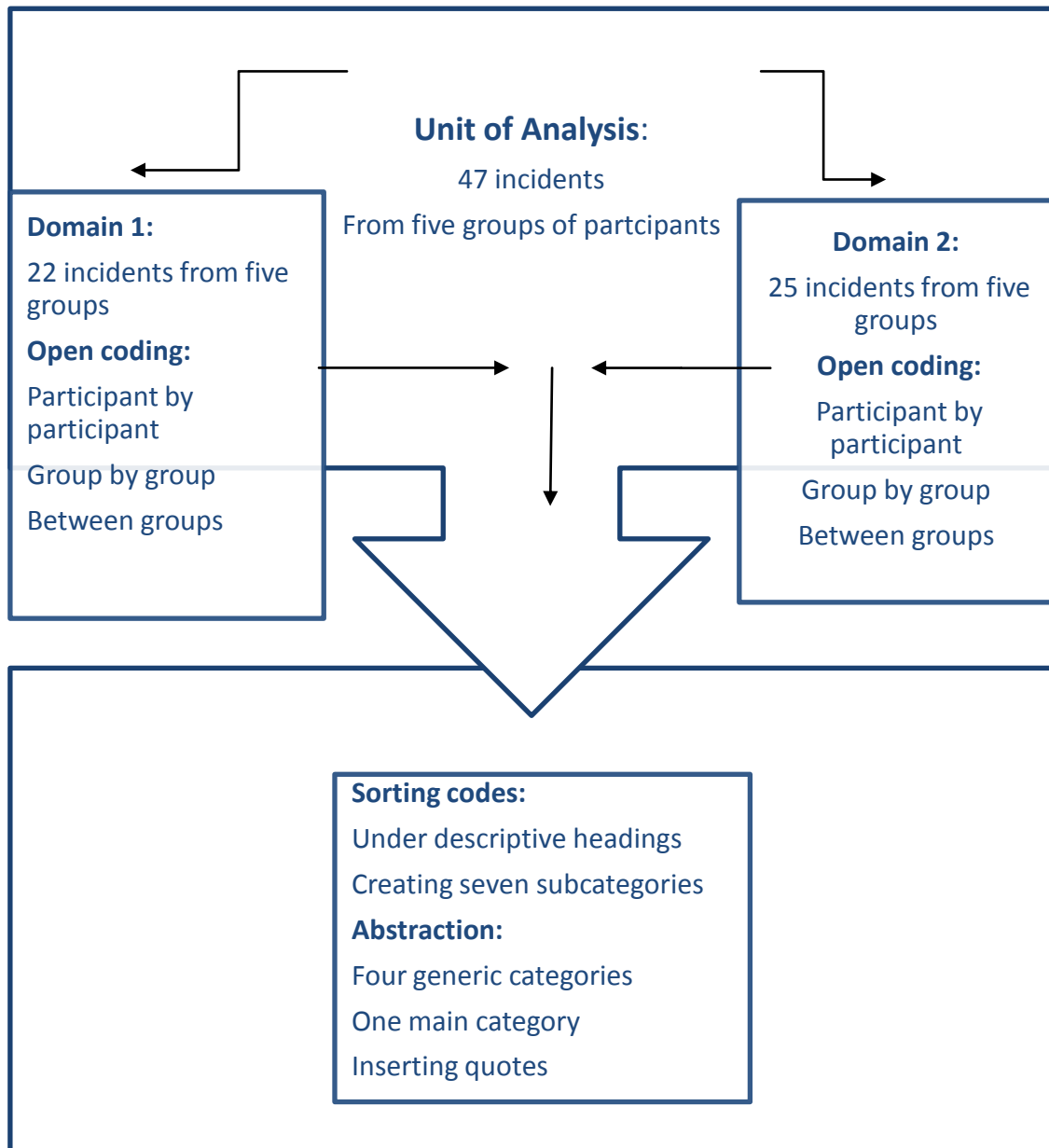


Figure 2. Inductive qualitative content analysis, Study II

In the preparation phase, a total of 47 incidents were identified in the interviews and were divided into two domains. Twenty-two incidents were sorted into the domain of well-functioning collaboration and 25 into the domain reflecting the opposite (see Figure 2). In the organization phase, each transcript was read and coded. The descriptive codes were generated freely, covering all the material for initially each person, then each group, and after this between each group of participants.

Categories were subsequently generated by sorting codes under descriptive headings explaining issues facilitating collaboration in the teams. Categories were collapsed into seven subcategories and then abstracted into four generic categories and one main category. The incidents as a whole were then sorted on a continuum under each representative subcategory to ensure that they represented the material as a whole. Illustrative and descriptive quotes were inserted.

Study II was designed to describe and make inferences regarding which issues facilitated the learners' collaboration. The learners' and supervisors' experiences were captured through interviews, and the strength of the design was that it enabled the capture of comprehensive and varied descriptions. But there was also variation in how well each participant could remember and describe the incidents, which could partly be due to when the interview took place.

Two areas needing further examination had been identified at the end of the analysis in Study II. The learners experiencing control in their collaboration was one issue, and rounds as a learning activity were another. There was close to a three-year period from designing Studies I and II to moving on to considering the design of Studies III and IV. During this period, the review of both the materials in Studies I and II and other published studies reinforced the need for further examination of rounds as a learning activity in IPE. It also identified gaps in published studies concerning the issues of facilitating control in teams of learners and their support-seeking. This led to reflection on the design of Studies III and IV.

5.1.3 Study III

Study III was a descriptive study, focused on the support-seeking interplay in teams of learners during rounds at the ITU in the ICU.

The research group and I reviewed diverse designs and then the materials collected in Studies I and II, which were rich and diverse. One previously unused source was added (See Table 3). To compose a description of the learners' support-seeking interplay during rounds, the research group and I reviewed the earlier collected materials, excluding some that either were not focused on the issue or whose sound recordings were of poorer quality (see Table 3). This review led to the identification of materials for analysis with both width and depth.

Table 3. Materials for Studies III and IV

Materials	Amount of data collected	Materials included in analysis
<ul style="list-style-type: none"> • Focused ethnographic observations of 8 teams (Study I) • Collaborative interplay in interprofessional activities and demographic data (Study I) • Informal interviews of eight teams (Study I) • Reflection on collaborative activities (Study I) 	<ul style="list-style-type: none"> • 100 hrs. • Documented in electronically transcribed field notes 	<ul style="list-style-type: none"> • 25 rounds, range 20-120 min/round • 2-4 rounds/team • 0-6 interviews/team • 25 group interviews • 6 individual interviews
<ul style="list-style-type: none"> • Reflective group sessions of supervisors or learners with their supervisors (Study I) 	<ul style="list-style-type: none"> • 6 hrs. • Transcribed 	<ul style="list-style-type: none"> • Reflections of supervisors of Teams 1,2,3,5,6 on the teams' interplay • Reflections of learners with supervisors on Teams 3,5,6 on the teams' interplay
<ul style="list-style-type: none"> • Sound recordings • Verbal interplay during rounds of 8 teams 	<ul style="list-style-type: none"> • 20 hrs. • Electronic files 	<ul style="list-style-type: none"> • 25 rounds • 2-4 rounds/team • Range 20-110 min/round
<ul style="list-style-type: none"> • 19 semi-structured interviews (Study II) • Experienced collaborative incidents from rounds and bedside work 	<ul style="list-style-type: none"> • 9 hrs. • 47 incidents • Transcribed 	<ul style="list-style-type: none"> • 15 interviews • 18 incidents focused on rounds • Incidents range from describing well-functioning (8) to neutral (4) to conflict (6) interplay.

Analyzing already familiar material with a new aim requires a process of stepping back and becoming aware of one's earlier analytic preconceptions. A good deal of time had passed from the initial analysis and writing of the articles from Studies I and II to now going through the original materials again. The eight-month long analysis departed from the field notes, and all analytic notes had been removed from the transcripts of collaborative interplay during the rounds.

The framework approach, a matrix-based method for analysis, was used to manage and make sense of the data and construct a theoretical description [49]. It was chosen to bring to the fore the support-seeking interplay in teams of learners during rounds from the entirety of the observed collaborative situations, reflections in and on collaborations, informal and semi-structured interviews, and sound recordings. The analysis process was done in five steps (see Figure 3), and resulted in one theme and three sub-themes.

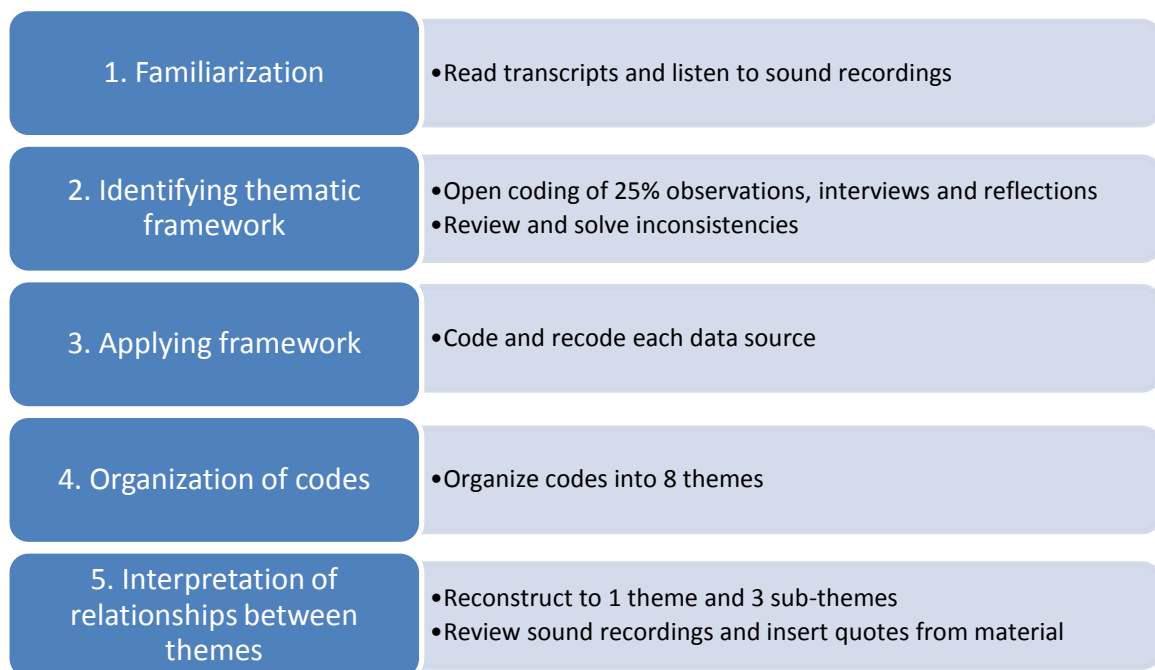


Figure 3. Illustration of steps of the analysis Studies III and IV

The observations, interviews, sound recordings and participants' reflections from group sessions enabled the description of both similarities and variations in how the learners sought support together to strengthen their interprofessional analysis. The strength of the design was partly due to using the framework approach, which led to an iterative process constructing an initial framework from part of the material from each data source and then applying it to the rest of the material and solving any inconsistencies through discussion. The design enabled further descriptions on parts of a complex process from observed actions and reflection on actions. The sound recordings were used to ground the analysis; they were of varying quality, which would entail difficulties in using this as a single source of data in a separate study.

5.1.4 Study IV

The last study is descriptive, and focuses on the supervisors' strategies for facilitating the learners' control in their collaborative interplay during interprofessional rounds at an ITU in the ICU. As mentioned above, the materials collected in Studies I and II were reviewed and one previously unused source was added (See Table 3). We excluded materials that were not focused on the issue, and some of the sound recordings were also excluded due to poor quality (see Table 3).

The framework approach was used to describe and interpret the supervisors' strategies for facilitating the learners' control in their collaborative interplay during interprofessional rounds. This was initially done simultaneously with the eight-month analysis process in Study III. Analyzing and bringing to the fore the supervisors' actions and experiences required partly viewing the whole activity and partly only viewing the supervisors' actions; the latter took another two months. The analysis process consisted of five steps (see Figure 3), and resulted in one theme and three sub-themes.

The strength of the design in Study IV was that observations, interviews, sound recording and the participants' reflections from reflective group sessions enabled the formulation of descriptions of the supervisors' strategies and actions exploring the *how* and *why*, and explanations of variations in how successful the supervisors' strategies were.

6 TRUSTWORTHINESS, CREDIBILITY AND REFLEXIVITY

There is no single true reality, but research is partly constructed and partly corresponds to real-life processes. Ecological validity has to do with whether the results of a study pertain to the complex interactions of the everyday social world [50]. Validity is not about the tests and methods themselves, but rather how credible the inferences and interpretations derived from the analysis of data are [42]. The researcher is fallible, but has to be critical and should check and question whether the process and inferences are trustworthy and credible [45, 50-51]. The researcher should ensure that descriptions of reflexivity are made clear to the readers in order to enhance the credibility of the findings [51].

6.1 REFLEXIVITY

Reflexivity means making clear the ways in which the researcher and the research process have shaped the data collection and analysis [51]. It also means making clear the researchers' prior assumptions and experiences that may have shaped the process [45, 51]. Any personal and intellectual biases should be made known to the reader in order to enhance the credibility of the process and findings [51].

I am a specialist nurse at the ICU that hosts the ITU, and I am also an educator and one of the people who took part in the startup process of the ITU. This may have led to biases in the design, data collection and analysis process in various ways. Even though I had prior experience, I had no expectations about what I would find in studying the progress of collaborative interplay in teams of learners and the supportive actions of the supervisors. There was a lack of scientific material, and the focus was to form descriptions of what could be seen, heard and understood from the participants' actions and experiences. Nor did I set out with a predetermination to use qualitative methods or do all the data collection on my own. These choices came from the emergent process and the sensitive nature of collecting data in the ICU.

The process and tools used in reaching the descriptions should be transparent. In ethnography the researcher most commonly tries to attain an insider's perspective, but in focused ethnography it is more common that the researcher has experience from the setting and takes on the role of field observer [40]. In ethnography researchers use tools to be constantly aware of how personal biases, feelings and theoretical assumptions can shape the process. Tools like personal memos and theoretical memos were used during Study I, and their usefulness led to the use of diary and process notes in all the stages of Studies II-IV. These were used as tools for daily individual reflections and research group reflections when in the collection and analysis of material. The memos were also tools for making the analysis transparent for the research group and for writing the results. They were also useful in separating individual biases as well as analytic and theoretical descriptions in an inductive process.

As an intensive care nurse with experience and knowledge, it was vital for me to be aware of my preconceptions and biases regarding both the actions and experiences of my own profession and others. My preconceptions about the environment could also cause me to not

see, and therefore miss, certain issues. If I as a researcher look at the participants as experts, reflexivity means listening to what they say, observing what they do, and trying to understand the meaning of their actions. In a focused ethnographic study, descriptions of the context are at the core; this entailed stepping back and creating descriptions of the teams' interplay time and time again. The tools mentioned earlier were useful in creating descriptions, but using the interprofessional research group to discuss these issues and the emerging analysis was also helpful, as the group contained a physician and two educators, one of whom was an intensive care nurse (neither of them was involved in IPE or IPL).

I had not met the specialist nurse students before, and had only worked with one of the residents. I did have personal experience of working with all the supervisors, which might have made them more motivated to participate in the study. During the data collection, I stepped back from being a supervisor in the ITU and was there solely as an observer.

6.2 TRUSTWORTHINESS AND CREDIBILITY

It is important to clearly describe the strengths and limitations of the research process. Since I performed all the data collection, some might view this as a limitation in all the studies. Regarding issues of trustworthiness (see Table 4), the discussions and review of the research group and external experts can be seen as crucial in planning and setting up the design (Studies I-IV). This is also true of the pilot-testing of the design (I, II), the external and internal review of the pilot test, and the analysis (II), as well as the different ways in which inconsistencies of the analysis were resolved in all four studies. In Study I, the interprofessional research group triangulated the analysis by reviewing the codes, categories and subcategories. Agreement was reached through discussion. In Study II the three supervisors reviewed the accuracy of each step in the analysis. In Studies III and IV, the clarity and consistency of each step were scrutinized.

However, trustworthiness deals with how clear the researcher is in his or her descriptions of the data collection, but more so in connecting the description analysis to the results [43]. Issues relating to credibility focus on how well the researcher conveys and captures the complexity of the social world through his or her descriptions [44] and how data and materials capture different parts of these descriptions [45, 51]. It is important to consider whether the analysis and results capture the inferences and descriptions in a credible and trustworthy way.

Table 4. Overview trustworthiness and credibility Studies I-IV

Study	Credibility	Trustworthiness
I	<ul style="list-style-type: none"> • Triangulation methods of data collection • Triangulating co-analysts • Attention to negative cases 	<ul style="list-style-type: none"> • Pilot test of data collection methods • Pilot test methods for using field notes • Authentic citations from diverse sources in the material
II	<ul style="list-style-type: none"> • Attention to negative cases 	<ul style="list-style-type: none"> • Pilot test of interviews and analysis • External review of planned analysis process • Review and resolution of inconsistencies of analysis process in research group • Authentic citations from diverse sources in the material
III	<ul style="list-style-type: none"> • Triangulation methods of data collection • Attention to negative cases 	<ul style="list-style-type: none"> • Review of consistency and clarity of initial thematic framework by expert in research group • Review and resolution of inconsistencies of analysis process in research group • Authentic citations from diverse sources in the material
IV	<ul style="list-style-type: none"> • Triangulation methods of data collection • Attention to negative cases 	<ul style="list-style-type: none"> • Review of consistency and clarity of initial thematic framework by expert in research group • Review and resolution of inconsistencies of analysis process in research group • Authentic citations from diverse sources in the material

Methods of triangulation are not uncontroversial in qualitative research [42]. However, I have triangulated sources of data in three studies and the analysis in one study (see Table 4) to search for patterns that converge. Converging patterns in the different materials are used to develop an overall interpretation in the analysis, and as a way to create a comprehensive description in the results [42, 45, 51]. Converging patterns in the analysis is a way to check the integrity of inferences (see Table 4). Part of the credibility is to ensure that special attention is paid to negative cases, which in the analysis can help redefine the explanation of phenomena [51]. In all four studies, this served as a way to broaden and ground the explanation of the analysis (see Table 4).

Thinking more about trustworthiness and connected descriptions of analysis with descriptions in the results then, authentic citation from diverse sources is viewed as central [43]. These reflections and earlier feedback on capturing the negative voices and problems led to this being the core of the analysis and the writing up of the results in all four studies (see Table 4)

7 ETHICAL CONSIDERATIONS

The research process begins with one or several philosophical and ethical assumptions, which guide the researcher's choices in setting up the research design [38]. Ethical reflections are central in planning, performing and reporting the research [45]. Reflections on crucial issues like informed consent, privacy and risk of harm to the participants, other professionals and patients in the ICU guided the choices throughout the project. Ethical reflections were part of the entire process of the individual researcher and in group discussions throughout the project. The research has been carried out in accordance with the Declaration of Helsinki from 1964. The project was reviewed and approved by the regional ethical board (2009/5:10). After the two initial studies, the choice was made within the research group not to collect any new data for Studies III and IV.

The ethical board reviewed and approved the planned process of information, consent and reflections on harm and privacy in the planned studies. They also reviewed the ethical aspects of my being known in the environment by the staff as an intensive care nurse and at the university as a teacher, as this might have impacted both the supervisors' and the learners' participation. Due to choices made beforehand, I had not met the prospective specialist nursing students before their rotation and I had only met two of the residents earlier in my role as a specialist nurse. But I was known to all the supervisors at the ITU.

Consent was collected by others after information meetings preceding the data collection for Studies I and II. Oral and written information was supplied to prospective participants, and I did not work at the ITU or during the day shift in the ICU during the data collection process but rather had the role of observer. Oral and written information about the project was also supplied to the ICU staff and management throughout the project.

In Study I, I performed the data collection by following the teams of learners and supervisors in a variety of naturally occurring collaborative activities at the ITU in the ICU throughout the rotation. One specialist nursing student had declined to participate, so during that week any data collection was avoided that might in any way involve this student. The activities were made up of both critical and non-critical events, e.g. patient assessments, feedback sessions, interprofessional rounds, and airway and ventilation management. Considerations regarding the privacy of non-participants and the vulnerability of the patients, other ICU staff or professionals in the ICU environment shaped decisions throughout the process. Ethical reflections were documented continuously in memos during and after the data collection, and were discussed within the research group.

Any information that might lead to the identification of any participant or non-participant was removed from the written and electronic documentation in all the studies before the others in the research group had access to it.

8 FINDINGS

8.1 STUDY I

The learners' IPC progressed along a pattern of participation common to all eight groups. The overall nature of the progress is described in the category, and the distinct steps in the three subcategories.

Ways of becoming a team (WE)

The learners' participation in activities is described as ways leading to goals in which they are guided to become a team (WE). The learners initiate and refine a collaborative interplay whereby they draw on, negotiate and integrate their individual and common experiences into a shared understanding. It is a dialectic progress, and their conclusions regarding the patient's problems increase in complexity as they move between exploring and comparing different professional perspectives. They become more autonomous in their reasoning, and seek each other's confirmation throughout the four days. This is paralleled by the supervisors creating opportunities and guiding the learners in how to think and act together as a team. They progressively increase the learners' space, balance the learners' participation, and confirm, encourage and challenge the team to expand their reasoning.

Step 1: Finding ways to collaborate

The notion of learning how to collaborate by working together is not experienced as positive by all learners, and some voice frustration. The interplay on the first day is cautious. In starting to find each other and find structure, one of the learners takes the responsibility to lead the interplay in the activities. They start exploring and negotiating their different understandings, and switch to collaborative focused expressions, asking and listening for the other learners' experience. They seek active verbal confirmation (permission and expertise) from their supervisors before interpreting patient health status. The supervisors use strategies for the learners to maintain proximity and find each other by making known the demands on their interplay in collaborative activities. They guide the learners in finding, maintaining and contributing to a common structure in interplay. The supervisors alternate between listening, confirming, encouraging, and challenging the learners by asking open questions.

Step 2: Moving on as an emergent team

From the second day until early afternoon on the third day, the learners move on together and their participation progresses to attain "WE" as an expression of their collaboration. Sharing a common experience, they begin to take charge, focus on the common conclusions, and evaluate yesterday's goals of care. They begin taking turns, switching between leading and listening, and confirming each other actively. The learners begin questioning what they know, and what they need to know more for a fuller understanding. They connect several areas of the patient's problems, question each other, identify their limitations, and explore where to seek expertise. They begin leading whole activities. The supervisors step back, create more

space, and direct others to them; they also encourage and challenge the learners to make critical conclusions by exploring professional diversity while still maintaining professional boundaries and pursuing relevant expertise.

Step 3: Meeting challenges as a team

On the final day, the teams progress to meet challenges, and take responsibility for transferring and arguing for a common understanding of the patient's problems, while coordinating their work with other professions. They start up, lead, coordinate, and end activities together, and seek confirmation from each other regarding what kind of support they need from others. They focus on what they have identified as crucial for the patient, let themselves take stock, and move on from the non-crucial. They progress, form and negotiate hypothetical trajectories of future outcomes. They compare the relevance of their hypotheses and search for others. The supervisors actively observe and guide them in arguing for the relevant common, and the clarity and relevance of the teams' conclusions are challenged.

8.2 STUDY II

Half of the incidents are based on those related to rounds, and the rest involve patient-centered procedures bedside. The analysis rendered one main category and four generic categories.

The team being in control of their common understanding

A well-functioning collaboration consists of a patient-focused interplay driven by the team of learners in activities they encounter in the IPEICU. It starts with one learner identifying a problem and then the team negotiating why it is important for the patient from their different professional views. Being in control entails actively choosing when the supervisors should support their interplay. The supervisors' focus their facilitative actions on the team taking control of their collaboration by encouraging comparative reasoning and making choices together.

Motivation

Maintaining motivation for team-centered interplay is a critical issue in facilitating collaboration. Motivation is connected with experiencing meaningful change in interplay by learning something new, gaining a fuller understanding, or experiencing a connection between their work and the patient. Keeping the team motivated becomes a critical focus for the supervisors when there is an imbalance between the complexity of the work and the team's level of experience. If activities are continuously too complex, the team can experience problems with taking control in their reasoning. If the activities do not continuously present a challenge to both all learners, one person takes over. The supervisors tested different strategies in order for the team to stay motivated.

Time

Having time together is a critical issue for facilitating the learners' collaboration. Balancing their time between specific professional tasks and collaborative work can be a source of stress. When the decision of how to prioritize their work is taken over by others, they experience a loss of control. The supervisors initially focus their facilitative actions on supporting the team in finding structure in their time-consuming interplay. They encourage the learners to open up, think out loud, and focus their interplay on patient-centered aspects by encouraging, but also directing, them. When the team finds a collaborative structure and focuses their time on prioritizing coordination and delegation, the supervisor believes this is due to an emergent understanding of what is critical and what is common.

Experiences

Both learners contributing their experiences to the interplay is critical for facilitating collaboration. They have to believe their contributions are meaningful, with others listening to and challenging them. The supervisors balance all the learners' contributions, and their facilitation focuses on opening up interplay to attain a comparative focus and explore what is known and understood. They refocus the team's dialogue, encourage them to explore professional boundaries, and address who has the formal authority. If there are gaps, they reassure the team this is natural and encourage them to deal with it.

Reflection

A critical issue for facilitating collaboration is reflecting on common activities and feeding forward how the group can think and act in future situations. The content of the reflection should focus on relevant goals and start from a shared activity. The activity needs to be broken down into steps, in which the learners start examining their performance and the supervisor follows. The learners would like the supervisors to be more critical. The supervisors focus on strengthening the learners in a safe environment, encouraging them to evaluate themselves, and guiding them through the process.

8.3 STUDY III

Training how to seek support during rounds is crucial for the learners to analyze the interprofessional dimension of their work and to progress together as a team. In successful cases, the team gradually gains confidence together through their collaborative interplay.

Filling the interprofessional gap by seeking support together

The teams of learners are guided by the supervisors to seek support together in their interplay during rounds. To seek support together, it is necessary that the learners feel it is safe to open up and that their experiences are taken into account. In successful cases, seeking support together enables the learners to progress to an interprofessional analysis whereby they agree on conclusions that are based on relevant information and expertise. Variations in how well

the learners seek support together are framed by issues of time, the nature of the situation, and the learners' motivation.

The supervisors explicitly express that working as a team in intensive care involves seeking support together to face the teams' gaps in theoretical knowledge, experiences of how to do something, and different professional understanding. Beginning to fill the interprofessional gap involves the learners exploring each other's experiences of the patient's problems in their analysis, and ends in conclusions spelled out by the teams, identifying whether more knowledge is needed from other professionals. This means exploring what they understand, and what is unclear or incomplete, and involved three interrelated aspects.

Seeking information together

Seeking information together entails learners taking into account substantial amounts of information in their analysis and identifying interprofessional gaps together. Taking the time, having written and verbal sources available, and evaluating information together in a structured fashion comprise an important part of making informed interprofessional conclusions. By comparing different sources, they identify gaps and reduce the risk of misinterpretation and drawing conclusions based on the wrong information. Seeking information together opens up the interplay, as critical questions emerge when they support each other while questioning the relevance and amount of information as well as what more is needed from other professionals.

Seeking confirmation together

Finding and filling the interprofessional gap entails a confirmative interplay whereby both learners are expected to participate by actively listening, leading and verbally confirming the others in the interplay while reaching interprofessional conclusions. Strengthening the interprofessional conclusions means seeking confirmation together through the analysis and taking into account the other learners' experiences of the patient's problem. Seeking confirmation together strengthens their conclusion by opening up their interplay and leaving room for acknowledging disagreements and contradictions as well as building on other experiences. Both learners are expected to contribute to filling the interprofessional gap.

Seeking expertise together

Rounds comprise an activity in which gaps of knowledge become visible to the teams through their interplay. Seeking expertise together entails the teams of learners exploring and integrating diverse interprofessional knowledge into a whole through their analysis. In successful cases, seeking expertise together leads to interplay in which the learners allow and support each other to reason out loud. They encourage each other by using active verbal cues, and acknowledge diverse professional expertise and the interplay. This involves listening to, encouraging and questioning each other. Gaps are often found when the patient's problems are the most complex, for example a multifocal problem, or when the learners have insufficient knowledge. When the boundaries between each profession's expertise are unclear

this means exploring, but not crossing over, perceived professional boundaries. Expertise within medical and nursing areas is sought from their supervisors, and paramedical expertise from physiotherapists. The interplay within the teams involves dealing with dimensions of praxis and experiences. The team targets and makes their questions specific.

8.4 STUDY IV

The interprofessional rounds at the ITU in the ICU are time-consuming learning activities (20-120 minutes per observed team/day) in which the team plans and coordinates the patient's care. They train how to find structure and reach conclusions together.

Stepping back for the team: strategies for facilitating the learners' control

The supervisors' strategies for facilitating the learners' control in their interplay emerge through actively backgrounding themselves and foregrounding the teams' collaborative interplay during rounds. The supervisors' strategies build on the learners' strengths in their interplay, and through being aware of their challenges in interplay. The challenges are related to individual, interpersonal and contextual aspects. For the safety of the patients at the ITU in the ICU, the learners' analysis must explain how each profession problems. The learners must engage in an interprofessional dialogue through which they seek support and actively question each other.

The supervisors believe that maintaining control during rounds is a dynamic process and that it is natural for learners to lose control of the interprofessional aspects in their interplay. The goal of the supervisors' strategies is that the team is to regain control. They guide the learners back to the interprofessional aspects of their interplay, and facilitate the team in moving on in the analysis together. The supervisors' actions emerge from their strategies, and there are variations in how well their strategies succeed depending on how sensitive, well timed and clear their actions are. The supervisors have expectations on how the team should progress and try to find different ways to encourage this, but sometimes their frustrations show. Their strategies switch between three aspects.

Encouraging the learners to regain control and move on together

Training how to find and maintain an interprofessional focus in the analysis requires learners to participate in the interplay. Hierarchical interplay driving the planned interprofessional care leads to serious risks for the patient. The supervisors use strategies that encourage the team to regain interprofessional control and move on together. The supervisors' strategies focus on encouraging the team to find a balance between leading and listening. The supervisors' strategies develop as a result of understanding the reasons behind observed challenges. The learners feel insecure in their role, in the environment or due to being inexperienced, or can react negatively to IPE examples given. Encouraging cues, using space and using questions are actions that come from their strategies. The supervisors acknowledge that the tone, level and frequency, and to whom they direct the question, are aspects that can

influence the team in regaining control in their interplay. Encouraging the teams to open up through comparative questions and minimizing their experienced pressure is a way of achieving balance. The supervisors balance their physical space to the team and create a safe space to encourage them to regain control, open up, switch roles and move on in their interplay.

Confirming the learners in regaining control and moving on together

An analysis driven by undifferentiated reflection or lacking distinction between intra- and interprofessional aspects of the teams' conclusions carries a risk for the patient. The learners maintaining control in their interplay during rounds enables them to train how to develop a structured interplay whereby they explore but maintain professional boundaries in their conclusions. The supervisors suggest that it is natural for the learners to be overwhelmed by the complexity of the patient's problems. To allow the team to regain control and find structure, their strategies strategy can switch to confirming parts of the learners' conclusions. This strategy often surfaces as verbal cues during rounds, with supervisors directly confirming the relevance of one part but also confirming the need to develop the conclusion further. The cues also confirm the learners' progress so far, as well as the need move on. Limited experience in one or all learners and variations in the team's common experience level in relation to the complexity of the patient's problems are some of the reasons behind persistent challenges whereby learners lose focus and drive in their interplay and cross professional boundaries. The supervisors acknowledge that holding back with their questions is a way to confirm the learners' control. If the teams have problems maintaining a clear focus or clear roles, or if they are overwhelmed, short and structured questions can help them regain control by working together to find the answer and then moving on. If one learner continually crosses professional boundaries, the supervisor redirects the question to another learner to explicitly differentiate between nursing and medicine. The strategies the supervisors use for the team to regain control and for their interplay to move on are also seen as actions that allow them to directly confirm the complexity of the situation.

Challenging the learners to regain control and move on together

The critical condition of the patient requires the learners' interprofessional analysis to focus on the respective severity and priority of the patient's different problems. The supervisor stresses that all the teams display a patient-centered focus in their interplay, but a large proportion of their time is focused on describing the patient's problems. Instead, they must focus more on which issues they view as more critical and why these should be prioritized. The supervisors challenge the learners to regain control, participate, and stay one step ahead. Their strategies result in actions that challenge the learners to exclude the non-critical, build on each other's reasoning, and develop hypothetical reasoning by drawing on both common theoretical knowledge and practical experience. This requires the team to maintain control, while in certain cases leaping from what is presently known to developing hypotheses about the future. The supervisors acknowledge that this requires a setting where the team feels safe

and is given the latitude to think, and that they encourage this through strategies such as silence, avoiding eye contact, or waiting for one of the learners to start reasoning. The supervisors' questions aim at opening up the interplay, prompting the team to compare and hypothesize. The question is initially directed to the learner with more experience in the area.

9 DISCUSSION

Any learner entering the ITU in the ICU has thoughts on what collaboration entails from their earlier experience in health care, and on how meaningful they consider IPE to be [52].

Research has shown that students can have preconceptions of their own as well as other participants' role in the team [21, 53]. These preconceptions are one of the many issues that in my four studies shape the learners' participation in collaborative interplay throughout their rotation in the ITU at the ICU [52, 54-56].

Studies suggest that rotations at an IPTW strengthen students' insight into their own role as well as those of the others in a team, and also strengthen their professional development and understanding of teamwork [57-58]. Women appear to be more positive to working in teams [22, 59], and students have lasting impressions of collaboration after their rotation [19, 23].

9.1 IPC, A FACILITATED PROGRESS OF PARTICIPATION AT THE ITU

The four studies included in this thesis have, in different ways, captured aspects of the learners' participation in interprofessional interplay and the supervisors' facilitative actions at the ITU [52, 54-56].

My four studies describe patterns of participation and facilitative actions in different types of interprofessional interplay, ranging from conflict to agreement. The patterns of participation also stem from a range of interprofessional activities, rounds [52, 54-56], and bedside activities [52, 54] on all four days of the teams' rotation [52]. Learning how to collaborate by training together in a new setting can cause friction in a heterogeneous group of learners, which was evident in the learners' interplay on the first day in the ITU [52]. This friction results in actions that can be observed in the learners' participation during rounds [52, 55-56] and bedside activities [52] in the ITU. These actions are directed towards each other and their supervisors, and are aimed at achieving the goals of the training [52, 54-56]. Friction can have both negative and positive connotations, but progress is made through the learners' participation in activities and the supervisors' facilitative support in the activities throughout the week [52]. Since IPE, according to theoretical definitions, entails two or more professions learning from and with each other [14], learning how to collaborate should be driven by teams being motivated and making choices together [34]. The learners' IPC progresses in three common steps during the week at the ITU [52] which can be seen, heard and understood through analyzing their participatory interplay in activities [52]. The progress is neither friction-free nor experienced as positive by all; nor do all the learners appreciate interprofessional training, although their IPC still progresses [52].

Each observed week in my first study presented challenges: two teams had to take care of patients for whom the level of medical treatment or nursing care needed went beyond the curriculum; three teams had to switch patients; four teams had to switch one supervisor; and two teams lost their main supervisor due to the workload in the ICU [52]. My studies have suggested that the supervisors are present in the ITU [52, 55-56], and their strategies emerge from understanding the challenges the learners face in their interplay. Their actions guide the

team forward [55]. The supervisors guide the learners from being a group to becoming a team [52], by progressively stepping back and letting their facilitative actions confirm, encourage and challenge them [52] to move on in their analyses [55]. Some learners at the ITU in the ICU are insecure in the environment or in their role [55], while for some teams there is a persistent imbalance between the complexity of the situation they have to deal with and their level of experience [54]. Progressively understanding the reasons behind the challenges the teams face means working with different types and directions of questions [52, 54-55], using space [52, 55] and verbal cues, and sometimes firmly suggesting they should move on [54]. The learners in my studies experience aspects of IPC as both positive and challenging [52, 54, 56], especially when they feel a connection between their work and the patient's improved status [54]. Other studies suggest that learners' proximity to each other in activities enables collaborative practice [18]; that they enjoy working together in a team [16]; and that they learn through participation with each other [53], particularly enjoying scheduled activities in which IPC is emphasized [16].

Other studies suggest that teams of learners deal with the unexpected and that individuals are not always invited to participate in activities [18, 53]. In my studies, in some cases this led to conflict and to learners withdrawing from the collaborative interplay [52, 54]. Research indicates that the level of collaboration or conflict in an ICU team is influenced by factors such as authority, education, knowledge, resources and time [35]. New graduates suggest that the reasons for whether or not they participate in IPC are connected to individual, team and organizational factors [7]. How the work is carried out in an intensive care team is influenced by a range of different factors, including relationships as well as organizational and contextual aspects [60].

Looking across the studies presented here, it became evident that the IPC in the teams of learners at the ITU must be viewed in relation to how the supervisors went about facilitating the progress of the learners' collaborative interplay [52, 54-56]. The supervisors acknowledge that each team is unique, but they also have expectations on the learners' participation [55]. These expectations relate to the progress of the teams' participation in activities like rounds [55], and they challenge the learners to reach further, to reach more complex conclusions together [52]. They supervisors declare that they try to create opportunities for the teams of learners to think and act together, to balance the learners' participation, and to suggest strategies for the team to regain interprofessional control by continuously encouraging, confirming and challenging them [52, 54-55]. During the week, the progress of the learners' ways of participating in collaborative activities was also paralleled by how the supervisors progressively guided the team [52]. In the interface between these two movements, the concept of the team of learners gaining ownership can offer some important insights.

9.2 **GAINING OWNERSHIP AS A TEAM, A FACILITATED PROGRESS AT THE ITU**

My studies directly and indirectly indicate that the notion of gaining ownership can offer insight into the teams' progress during the week in the ITU. My studies suggest that ownership is something that is actively and gradually gained through the team of learners stepping forward in their interplay [52, 54-56], and when the supervisors acknowledge this achievement by stepping back [52]. My first study suggests that the emergent team of learners in the ITU gain ownership when they progressively act and gain the autonomy to act as a team [52]. In this progress they also increasingly seek support from each other, and then from others, when negotiating and integrating their experiences into interprofessional conclusions [52, 55-56]. In gaining ownership, they progressively seek support from each other and others to confirm their conclusions based on relevant information and expertise[56], or to determine whether more information is needed and where that information can be obtained [52, 56]. The learners train in a structured way in how to identify and address their interprofessional gaps of knowledge during rounds [56], and how to strengthen their interprofessional conclusions in their activities[52, 56]. As an emergent team, they progressively argue for and transfer their understanding of the patient's problem together. As an emergent team, they argue for and transfer their understanding of the interprofessional care they believe is central based on their understanding, and coordinate their work with others [52].

Ownership is something that other research confirmed is perceived by the participants in an ICU team [10]. Due to their expertise, the participants in these teams have the right to participate, negotiate, and make decisions concerning patient care along with others [10]. This perceived collective ownership forms the group's identity and promotes their collaboration [10]. The individual ownership of the participants in the ICU team needs to be recognized by others. Conflicts often center around when the collective or individual ownership is not recognized [10]. In training individuals who are regarded as specialists, ownership is a vast concept [61] and can be hard to capture. A recent theoretical description suggests that ownership in patient care is something that trainees gradually assume [61]. Autonomy and teamwork are aspects that trainees and supervisors agree are core elements of ownership, and they identify common behavioral aspects [61]. They agree that ownership entails a learner having the autonomy to think critically, act and be aware of his or her own limitations and therefore actively ask for support and direction [61]. The trainees and supervisors also agree that teamwork is a core element of ownership [61], whereby collaboration means working with others who share responsibility for the patient and claiming ownership of their own[61]. Ownership means committing and actively participating in activities and following through by coordinating care [61].

Other research points out that only the learners in study suggest that ownership means struggling with hierarchical tensions towards those who are more experienced, as well as leading and being in charge [61]. This confirms what my first study suggests [52], that gaining ownership means that both supervisors and other professionals in the ITU

progressively acknowledge the team of learners leading patient care. My second study suggests that the learners being in control in the activities they encounter is a vital issue for facilitating IPC in the teams [54]. As suggested in the previously mentioned theoretical description, control can be viewed as aspects of committing to participation [61] and gaining autonomy together in a perceived ownership of both the activity and patient care. The learners suggest that they need to have a sense that they are together propelling the patient-focused interplay forward [54], which can be viewed as an aspect of autonomy and independence, which are core elements of ownership[61]. The learners' sense of being in control starts with their identifying a problem and, in the progress of reaching a common and more critical understanding, negotiating why this is important for the patient based on their different professional views[54]. My other studies confirm parts of this [52, 55-56], but also suggest that the learners' analytic interplay entails steps of exploring, comparing, evaluating and verbalizing their agreement or disagreement concerning their interprofessional conclusions (see Figure 4). This can be viewed as a common circular motion that begins and continues, not ending until the learners' interprofessional activity is over.

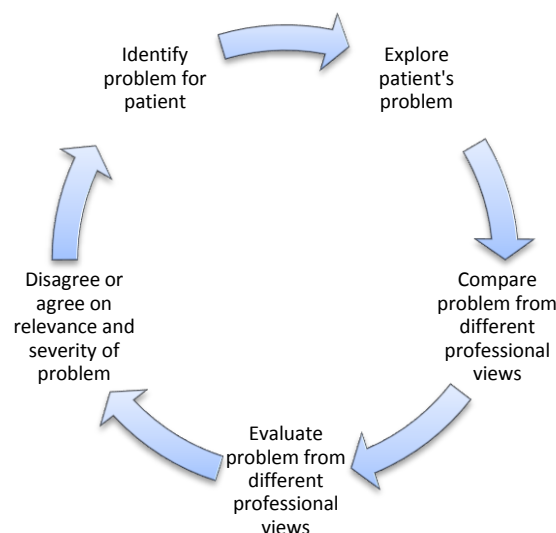


Figure 4. The learners' interprofessional analysis

In their interprofessional analysis, the learners suggested that they needed to take control of how time was spent [56], and to take control and make choices relating to when and from whom they sought support from [54]. In successful cases, the learners sought support from each other and confirmed and strengthened their analysis [56]. They supported each other, listened to and encouraged each other [55-56], and critical questions emerged, helping them strengthen their joint analysis [56]. The question of who takes control of the interplay when more experienced practitioners are present has been confirmed as a core element of ownership in patient care[61] and in group scenarios[62]. In successful situations, through their negotiation learners will appropriate an understanding of what is vital for the patient[37], gain authority, and act on what is vital for the patient. When the students in a study controlled their interplay, they had ownership of the questions they raised and sought

confirmation from each other[62]. Throughout the week in the ITU, the learners' interprofessional interplay switches more smoothly between leading and listening [52]; they start up, lead and end activities together[52], and question the relevance of their conclusions together [52]. Some of the learners suggest that having to question their own understanding and negotiate this against someone else's professional knowledge expands what they know [54]. They also emphasize that IPC requires effort, and that learning something new or understanding something more fully sustains their motivation in the interplay[54]. This reflects a feeling that their experiences and contributions are meaningful, listened to and questioned [54]. Opening up, stepping forward and claiming ownership require a sense of authenticity in the interplay, and that both their individual and collective ownership are acknowledged. The worth of, benefits from, and motivational aspects related to, learning with other professions have been confirmed by students in different ways in a number of studies investigating various IPE settings [16, 18-19, 23, 25, 63-67].

The supervisors suggest that as a member of an ICU team one has to deal with both gaps of interprofessional knowledge on a daily basis [56] and losing control in your interprofessional analysis [55]. Gaps of knowledge can involve everything from lacking theoretical knowledge about something or experience in how to do something, to variations in how the different professions view a particular problem [56]. Losing interprofessional control can lead to tension and conflict, but unprofessional control in interprofessional care can also lead to risks for the patients in the ICU [55]. For this reason, it is vital that the emergent team train in how to identify and begin to fill interprofessional gaps with both relevant information and expertise, and to do this together [56] to become more legitimate participants in the interprofessional setting. The supervisors suggest that the learners need to take control in their IPC [54] and train in how to identify and reach interprofessional conclusions in specific activities like rounds [55]. Allowing hierarchical patterns of interplay, omitting the evaluation of risks, and undifferentiated conclusions are all dangerous to the patient [55]. They use strategies to encourage, confirm and challenge the team to regain interprofessional control and move on in the analysis [55]. They try to balance facilitative actions that are supportive and provide structure with those that give latitude and allow independent reflection [52]. Loss of control in the team, frustration, and feeling like a "backseat driver" can be linked to supervisors, with a less sensitive tone, untimely action or a hidden motive, more readily suggesting that the team needs to move on[52, 54-56]. A number of studies have acknowledged the complex but important role supervisors play in knowing how, when and to whom they should direct their facilitative actions [15-16, 27-28, 32, 53, 68]. One study suggests that nurses as a team use strategies for the team to carry out independent work, facilitate professional understanding, and break down hierarchical barriers [27]. Another suggests that each activity has parts that are controlled by either the facilitator or the students, but that there is mainly a negotiation between the two [62].

In the present research, supervisors suggest that each step in the progress and each activity represent challenges for guiding the team through their facilitative actions to step forward,

maintain control in their analysis, and take ownership together [52, 54-56]. The initial activities, and the learners beginning to explore, compare, and evaluate interprofessionally, are quite time-consuming processes [52, 54] [54]. In particular, supervisors make explicit the demands on the learners' participation in activities, encourage them to use tools to find structure, and use cues, questions and space to guide the learners to find each other [52]. When the learners progress and start becoming a team, the supervisors step back to let patterns of interplay unfold, and balance and direct both the learners to each other and others to them. Moreover, they encourage and challenge unclear reflections and prompt the learners to explore and maintain professional boundaries [52]. The supervisors also encourage the learners to focus on patient-centered aspects by asking questions and sometimes directing them to move on. The supervisors suggest that, around the time the learners start using their time efficiently and finding a working structure, this is due to active reflection and an emerging understanding of what is relevant for the other to know [54]. This is often connected with their using the shared time to prioritize, coordinate and delegate their work and actions [54]. In the final part, the team can take ownership when challenged to argue for the relevance of their care.

To conclude, to train teams of learners in how to collaborate, one must guide them to begin to think like a team and feel like a team, progressively acknowledge their authority, and let them take ownership and act as a team.

10 CONCLUSIONS

- From my studies, it can be concluded that training in collaboration in interprofessional teams at an ITU can be important for learners in their specialist training. Even if IPE is not experienced by all learners as valuable or important, after the initial friction and conflict the learners still progressed together in their collaborative interplay from one activity to another.
- From the studies it can be concluded that the eight teams progressively became autonomous and transferred their understanding of the patient's problems. They transferred and argued for what was crucial to prioritize in the patient's interprofessional care, while coordinating their work with other professions within and outside the ICU.
- The learners trained in exploring, comparing and integrating their different professional perspectives into progressively complex conclusions. They adopted a patient-centered approach in their analysis during both rounds and bedside activities. They progressively sought support from each other as well as others to confirm that their conclusions were based on relevant information and expertise.
- The learners' collaborative interplay progressed between the different activities due to daily reflection and feedback on how to improve their interplay.
- Each team in the ITU is unique, and they all face a diversity of challenges in their collaboration due to individual, interpersonal, and organizational issues. Successfully training groups to become teams requires supervisors to use strategies that facilitate the progress of each team based on its unique need for support.
- The supervisors' strategies emerge from being present, and through their understanding of the challenges each team faces. The supervisors' strategies build on the teams' strengths in their interplay, and their facilitative actions have the goal that the team will take interprofessional control in their interplay and move on together.
- The learners experiencing control was a crucial issue for facilitating a functional collaborative interplay in activities, and this involved making choices relating to when and from whom to seek support. How well the supervisors succeeded in supporting the teams varied, but they used their experience to guide the learners to find, question and argue for the relevance of their common contributions.
- There can be benefits for patients in the ICU when future specialists train interprofessionally. According to the supervisors, hierarchical interplay, unstructured interplay, undifferentiated conclusions, and not evaluating the severity of the patient's condition from different professional perspectives were challenges that occurred to different extents in the learners' interplay. Such conditions represent potential risks to patients.
- Teams need to train in identifying IP gaps in knowledge, exploring but not violating professional boundaries. Both professions need to participate in order to regain interprofessional control and own their conclusions together.

- One future direction in research could be to follow up on the learners' long-term experience from the ITU and explore their suggestions for improving the learning experience for other teams in the ITU.
- Another future direction could be to explore the strategies the supervisors use to diffuse conflict in the teams, or between themselves and the teams.
- A final important area of research would be investigate the reflective sessions as an activity for learning and feedback

11 SAMMANFATTNING

Bakgrund: Interprofessionell utbildning utgörs av aktiviteter där två eller flera professioner lär sig med och av varandra. WHO har uppmärksammat vikten av att blivande specialister tränar tillsammans inom hälso- och sjukvården för att förbättra samarbetet inom den patientcentrerade vården. I Sverige finns det idag kliniska utbildningsenheter där studenter inom grund- och specialistutbildning tränar samarbete genom att arbeta och reflektera tillsammans i team. I olika utbildningsaktiviteter såsom patientnära arbete och ronder har studerandeteam och handledare olika förväntningar på studenternas deltagande i teamets samarbete. Det finns även förväntningar på hur handledarna ska stödja och möjliggöra teamets lärande. Det finns begränsat med forskning som beskriver samarbetsprocesser, lärande och handledning av team av ST läkare och specialistsjuksköterskestudenter inom intensivvården och en ökad kunskap är därmed viktigt.

Syftet med avhandlingen: Att med vetenskapliga metoder bidra till att utveckla förståelse för samspel i lärandeteam och betydelsen av handledarnas möjliggörande stöd på en interprofessionell utbildningsenhet inom intensivvården. Studierna fokuserar på utvecklingen av samarbetet mellan specialistsjuksköterskor och ST läkare samt handledarnas strategier för att teamet ska uppnå ett kontrollerat samspel i arbetet.

Metodologi: Sociokulturell teori betonar att lärande uppstår genom att individer deltar med andra i olika aktiviteter. Avhandlingen består av material från fyra kvalitativa studier. Studie I: Utgör en fokuserad etnografisk studie där syftet var att utforska samarbete i lärandeteam under deras placering på en interprofessionell utbildningsenhet inom intensivvård. Det interprofessionella samspelet utforskades i åtta team genom 100 timmars observationer, informella intervjuer och ljudupptagningar av reflektionstillfällen. Materialet som följde åtta team och deras handledares (n=28) analyserades genom konstant komparation. Studie II: Var en semistrukturerad intervjustudie med 19 deltagare. Syftet var att beskriva vad som möjliggör samarbete i lärandeteam på samma interprofessionella utbildningsenhet inom intensivvård. Intervjuerna analyserades genom kvalitativ innehållsanalys. Studie III: Analyserade sätten som lärandeteamet sökte stöd tillsammans under rondsituation. Observationer, informella intervjuer, semistrukturerade intervjuer, ljudupptagningar av reflektionstillfällen och ronder. Innehållet återanalyserades för att beskriva samspelet mellan 46 deltagarna under ronden. Studie IV: Utgår från det material och den analysmetod som beskrivits i studie III. I denna studie låg fokus på att analysera och beskriva sätten som handledarna använde för att möjliggöra för teamet att ta kontroll i deras interprofessionella samspel under ronden.

Resultat: I de fyra studierna beskrivs olika aspekter av och fördjupande förklaringar till både lärandeteamet samspel och handledarnas stöd. Studie I: Här beskrivs de tre steg som under veckan låg till grund för utvecklingen av lärandeteamet samarbete när de rörde sig från att vara en grupp till att bli ett team. Handledarnas stöd utvecklades parallellt och de kunde gradvis träda tillbaka när teamet tog kontroll över sitt arbete. Studie II: Här beskrivs hur teamets kontroll i sitt samspel var av avgörande betydelse för att möjliggöra deras samarbete.

Motivation, tid, erfarenhet och reflektion var även kritiska aspekter. Studie III: Här beskrivs hur lärandeteamet sökte stöd tillsammans och det fanns variationer i hur väl de lyckades med detta rondan. Vid lyckade tillfällen utforskade, analyserade och började teamet fylla sitt interprofessionella kunskapsgap tillsammans. Lärandeteamet sökte information, expertis och bekräftelse tillsammans för att kunna vidare i sitt arbete som ett team. Studie IV: Här beskrivs de strategier som handledarna använder sig av under rondan för att teamet ska upprätthålla interprofessionell kontroll i sitt samspel. Handledarnas strategier utvecklades från att vara närvarande på rondan och från att de gradvis började förstå de utmaningar teamet hade, och var tvungna att konfrontera i sitt samspel. Handledare bekräftade, uppmuntrade och utmanade teamet att återta kontroll och gå vidare i sina resonemang. Handledarna bekräftade, uppmuntrade och utmanade båda i teamet att delta och att upprätthålla en tydlig struktur för att kunna analysera kritiska aspekter av patienternas problem från sina olika professionella perspektiv.

Slutsats: att träna och lära sig att samarbeta på ett konstruktivt och lyckat sätt inom intensivvården kräver ett möjliggörande stöd. Mer forskning behövs inom utveckling och långtidsvinster av att träna interprofessionellt.

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